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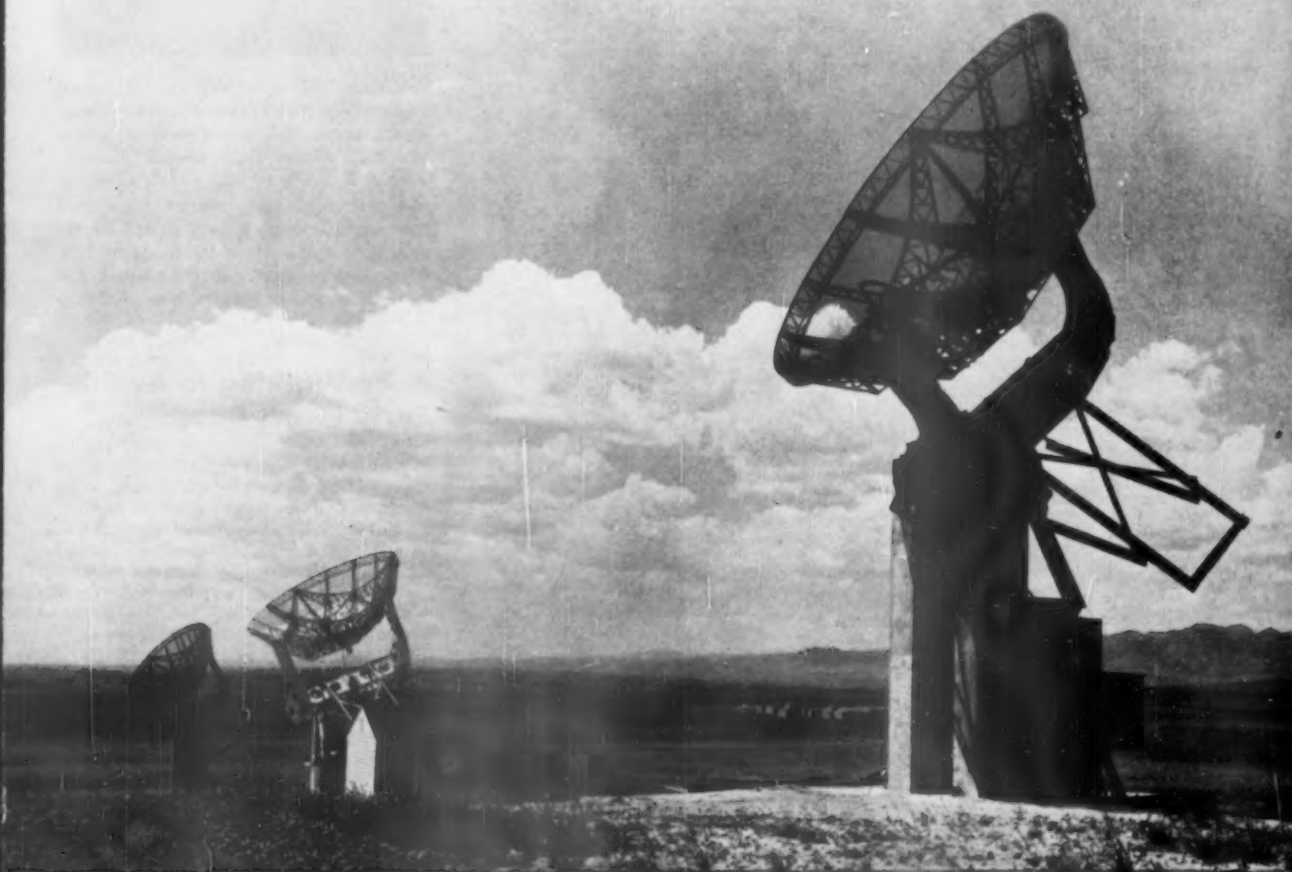
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September 18, 1954

VOL. 66, NO. 12 PAGES 177-192

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



Sun Trackers

See Page 185

A SCIENCE SERVICE PUBLICATION

NUTRITION

Ice Cream Substitutes

Although the ice cream substitutes are proving popular, their close similarities cause confusion among customers. Ice milk used in milkshake-like drink.

► THE LOW-COST ice cream substitutes are pleasing millions of consumers in the states in which their sale is permitted. The products are so similar to ice cream that manufacturers and consumers alike are often confused and troubled.

Mellorine is difficult to distinguish from ice cream, even in the laboratory. In this product, vegetable or animal oils have been substituted for the butterfat in ice cream with a resulting loss in vitamin A content. (See SNL, Sept. 20, 1952, p. 190.)

The name "Mellorine" was originated by the Texas State Department of Health, in whose laboratories the product was developed, and it is willing to have other states use the term for the same type of product. "Mellorine" may soon be as common a word as "sherbet" or "ice cream."

Unlike Mellorine, ice milk has the blessing of the dairy industry. Ice milk is as much a dairy product as ice cream, but has more milk solids and fewer calories than either ice cream or Mellorine. It is not as smooth as true ice cream because it has only about one-third the butterfat.

The frozen dessert industry's new and old products confuse even the federal government. Hearings toward developing standards and definitions for ice cream and "related products" ended Dec. 31, 1952, after nearly two years, 22,555 pages of testimony and 443 exhibits.

No federal standards for any of the frozen desserts, including ices, sherbets and frozen custards, have yet been established.

Thus, manufacturers are not quite sure how they stand in the eyes of federal law.

If Mellorine is considered an imitation ice cream and not a distinct product in its own right—and there is some confusion on this point—then Mellorine must be labeled "imitation ice cream" to be carried across state lines. However, all the states that permit Mellorine within their borders ban the use of the words "ice cream" on any part of the package.

Consumers, of course, like the low cost of Mellorine and ice milk. By the pint, Mellorine costs from three to five cents less than ice cream, and ice milk costs from two to three cents less.

Mellorine-type products, although legally sold in only nine states, accounted for 1.5% of the sales of frozen desserts in 1953. Ice milk made up 8% of the total volume of desserts sold. The District of Columbia and 41 states permit the sale of ice milk.

One of the biggest reasons for the high sales of ice milk is a thick drink called "Malt-A-Plenty," "Drink-A-Plenty," and a variety of other trade names. The drink,

which is very much like a milkshake, is made with ice milk instead of ice cream.

Although the drink is served in a heavy paper cup on which is printed a trade name and which omits any reference to ice cream, many people believe they are getting a dressed up milkshake.

If the price of this drink is equal to that of a milkshake of the same volume with the same amount of frozen dessert in it, the consumer is plainly not getting his money's worth.

Persons who are counting calories either for gaining or losing purposes will want to be sure of getting the dessert they ask for.

Many manufacturers are worried about their less reputable brother producers who may attempt to sell the new products as the older, established product, perhaps even charging the higher price.

The International Association of Ice Cream Manufacturers has therefore resolved that to minimize the opportunities for fraud, the sale of Mellorine should be limited "to containers of one-half gallon and less, thereby prohibiting bulk sales."

The IAICM would likewise limit the sale of colored and flavored ice milk to packages of one-half gallon or less. Fountains might still use the unflavored product, with syrups added at the fountain, for various drinks.

Restaurants would be required to serve the new product in properly marked, individual containers.

However, even more damaging to what the industry calls "the integrity of ice cream," than fraudulent sale at the retail level would be the blending of butterfat with vegetable or animal oils, then palming off such a product as ice cream.

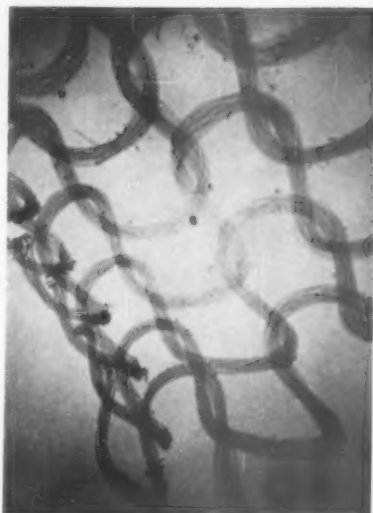
The industry advocates laws prohibiting such blending, and suspension of the license to manufacture frozen desserts for those who break that law.

Mellorine is sold in Alabama, Arkansas, California, Illinois, Missouri, Montana, Oklahoma, Oregon and Texas.

Ice milk is sold in 41 states and the District of Columbia, though not always under the name "ice milk." States barring the sale of ice milk include Delaware, Indiana, Maryland, New Hampshire, New Jersey, New York and Pennsylvania.

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Male goats were thought to have a vile odor because of skin-secreted caproic and caprylic acid, but two Dutch scientists find more of these chemicals in a dog's coat, yet no goaty odor.



NYLON STOCKING — As seen under General Electric's new X-ray microscope, this section of a nylon stocking shows each strand plainly. The symmetry of the nylon loops is indicative of the "elastic memory" that enables each strand to regain its original shape after stretching. The X-ray microscope is scheduled for quantity production.

MEDICINE

Keep Walking to Avoid Early Heart Death

► KEEP WALKING, if you want to avoid death by heart attack in middle life. This suggestion comes from a report by Dr. Percy Stocks of Colwyn Bay, North Wales, to the International Congress of Clinical Pathology meeting in Washington.

If you do not like walking, some other kind of exercise may do as well. The important thing, apparently, is that the exercise be regular and kept up through life.

Dr. Stocks based his suggestion in part on studies showing that early death from coronary occlusion was less frequent among bus conductors than among bus drivers, and less frequent among postmen than among telephone operators. People who keep moving on their job, he thinks, are less likely to have heart attacks early than those who sit while working.

While diet and the body's ability to handle fat may have something to do with development of artery hardening and heart disease, poor mechanics of circulation is also important, Dr. Stocks thinks.

Circulation mechanics may make the difference between having an important or an unimportant artery stopped, he believes. Mild exercise, like walking, regularly followed may be the necessary booster needed for good circulation.

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BIOPHYSICS

Relieve Arthritis Pain

Ultrasonic beams cut down pain and relax muscle spasm in arthritis patients. The technique may "prove to be one of the greatest advancements" in treatment.

► SOUND WAVES of such high frequency they cannot be heard have been cutting down the pain and relaxing muscle spasm in arthritis patients and helping arthritic cripples to walk.

These good results were reported by Capt. Edward P. Reese of the Army and Navy Hospital, Hot Springs, Ark., at the meeting of the American Institute of Ultrasonics in Medicine in Washington.

Capt. Reese said that he was "quite disinterested and pessimistic" when asked to start a study of ultrasonic treatment of arthritis because so many drugs, hormones and other treatments for arthritis had proved disappointing after first being hailed enthusiastically.

However, he thinks now, after a short experience with ultrasonics, that it "may prove to be one of the greatest advancements in the treatment of arthritis," and that it should be studied further.

Although all the patients so far treated had marked relief of pain, they still had some pain or occasional bouts of it. The character of the pain was changed from severe and sharp to a moderate or minimal dull ache or soreness.

Rheumatoid arthritis, he points out, is a chronic disease and it may be that the patients he has treated have not had ultrasonic treatment long enough to eradicate the pain completely.

Besides decreasing pain and muscle spasm, the treatment has let the patient relax and get restful sleep. It has made it possible to cut down the dose of aspirin, thus decreasing nausea and improving appetite.

Splints and traction to reduce spasm and absolute bed rest were not necessary when ultrasonic treatment was used. Temporary limitation of weight bearing, however, was necessary in several cases.

The treatment made it possible to start patients on exercises that strengthened muscles, and improved posture and breathing. Hands so crippled they could barely grasp very large objects were so helped that the fingers could close enough to grasp small articles.

One patient who had not improved with a year's treatment with cortisone was able, after ultrasonic treatment, to climb stairs and walk long distances for the first time in many years.

X-rays showed no apparent changes in bony deformity following ultrasonic treatment.

Capt. Reese and his associates, Capt. Dorothy M. Kinnison, WMSC, and Pvt. Herbert J. Jacobus, both physiotherapists, plan to continue the study and to include

a study of the effects of ultrasonics on chemical composition, cell count and viscosity of the joint fluid.

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BIOLOGY

Atomic Radiation Causes Tobacco Cancer Growth

► ATOMIC RADIATION can cause a healthy, normal tobacco plant to become cancerous, it was reported for the first time at the meeting of the American Institute of Biological Sciences, Gainesville, Fla.

Drs. Arnold H. Sparrow and Lloyd A. Schairer of the Brookhaven National Laboratory, Upton, N. Y., described the first positive proof that atomic radiation can cause tumors in plants.

Scientists have known for several years that atomic rays or particles, as well as X-rays, can cause tumors in humans, and it has been suspected that this was also true for plant life. However, previously, there had been no definite evidence.

Drs. Sparrow and Schairer exposed tobacco plants to gamma rays given off by cobalt 60, made radioactive in an atomic pile. This particular type of tobacco plant normally produces non-fatal tumors as it grows.

However, when bombarded by atomic rays, the plants became covered with a green-gray tumor mass. The life process was smothered, and the entire plant withered and died within a few weeks.

The cause of the increased tumor growth is not known. Biologists think that the cause is due to an attack on the living cells themselves rather than an interference with the structure of the chromosomes that carry heredity.

The continued study of the effects of atomic radiation on plant cells may help solve the puzzle of all cancerous growths, since plant cells are very like animal cells.

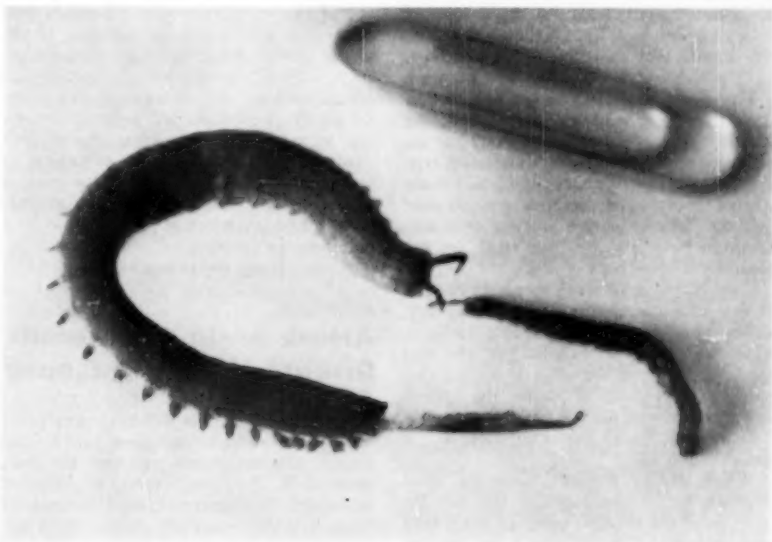
Science News Letter, September 18, 1954

CHEMISTRY

Now Know What Puts Nip in Catnip

► THE STUFF in catnip that makes it the favorite nip of cats is nepetalic acid, Prof. Samuel M. McElvain of the University of Wisconsin announced at a celebration of Prof. Roger Adams' 28 years of chemistry teaching at the University of Illinois. Now scientists can attempt to find out why cats like this essence of catnip so much.

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RARE BIRTH—Thought to be the only photographed birth of a *Peripatus*, this strange creature, rarely seen alive, was brought from Panama to the American Institute of Biological Sciences' meeting at the University of Florida by Byron E. Harrell, a graduate student at the University of Minnesota. The *Peripatus* had already given birth to one young, pictured above, when this photograph of the second birth was made. This creature is of unusual interest to biologists because it has characteristics of both worms and insects.

GENERAL SCIENCE

Human Behavior Rules

Physical universe is interpreted as an ideal human society, and the real human society attempts to ape this ideal as closely as possible.

► THE PICTURE of the physical world accepted by people serves symbolically to set rules of human behavior, Prof. Philipp G. Frank, Harvard philosopher and president of the Institute for the Unity of Science, observed at the Fourteenth Conference on Science, Philosophy and Religion at Harvard University.

The physical universe is interpreted as an ideal human society, Dr. Frank explained. The real human society attempts to become as similar as possible to this ideal. This approach then becomes the rule of its moral behavior.

Dr. Frank traced the effects of man's conception of the physical world upon his actions back to very ancient times.

As an example, we are accustomed to relax every seventh day of the week and the root of this habit is theory of the Old Testament about the way our physical universe originated. Dr. Frank pointed out that the Hebrew cosmology has been interpreted through the ages as a rule of human conduct that has not outlived its validity today.

The picture of the physical world that has been developed by physical science has undergone radical changes since the times of Plato, Aristotle and St. Thomas. However, Dr. Frank said that the picture outlined by Thomistic philosophy has not changed.

The foundations of the Thomistic doctrine have been and are today: first, the doctrine that every material body in the common sense meaning of this word consists actually of "prime matter" and "substantial form," and, second, the doctrine that the laws of nature are not only uniformities but "genuine laws" that are imposed by a lawgiver.

From such ideas arose the identification of evil with matter. Even in this century, a few philosophers and philosophically-inclined scientists have extolled the idea that the largest part of the atom is empty; that only very tiny pieces of matter, the nucleus and the electrons, are solid.

Dr. Frank traced this idea back to the matter-is-evil idea.

When atomic physics abandoned strict determinism as the supreme law for the motions of the smallest particles, Dr. Frank said, this was used as a symbol for the freedom of human actions.

Even communism has been influenced by ideas as to the form of the physical world. This was explained by Dr. Frank as follows:

"The philosophy of Dialectical Materialism which has become the official doctrine of all Marxist groups, has made continuous efforts to shape the picture of the physical world in such a way that the laws of human

behavior would be derived from physical laws by way of 'dialectics.'

"The laws of 'dialectics' have been construed as the most general principles which are equally valid for physical and social phenomena. The most palpable of these principles is the 'transition from quantity into quality.' If a property increases quantitatively more and more, a point will come when the property undergoes a change in quality.

"The most famous example in physics is the heating of water. As its temperature increases more and more, the water remains unchanged in quality; it remains water. But, at the boiling point, water is converted into a body of changed quality, the vapor of water.

"The physicist would not see in this presentation of the boiling process a great help to advancement in the theory of heat. But, Friedrich Engels, the main collaborator of Karl Marx, already has pointed out that this presentation shows clearly the analogy between the physical universe and social behavior.

"If, in a human society, the accumulation of the means of production (capital, machinery etc.) increases, the character of the society changes only quantitatively; the society remains qualitatively a society of private owners. But, if we apply the physical theory in its dialectical presentation, we can expect, that after great quantitative changes, great accumulations of capital in few private hands, there will be a qualitative change by which the means of production will be taken out of private hands and will become property of the community."

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PHYSIOLOGY

Attack Brain and Mental Disease With Ultrasound

► EXPERIMENTS LOOKING to an ultrasonic wave attack on some brain and mental diseases were reported by Prof. William J. Fry, Prof. John W. Barnard and Rolfe F. Krumins of the University of Illinois at the meeting of the American Physiological Society in Madison, Wis.

They have used ultrasonic waves to destroy brain tissue in an area as small as one-twentieth of an inch across, about the width of the lead in a pencil, without affecting tissues around, above or beyond the spot.

This precision seems to offer possibilities beyond the surgeon's knife for destroying tumors or deranged brain tissue since any

size or shape of area at any depth in the brain can be attacked. Nerve tissue is destroyed, but blood vessels are not affected.

Although the University of Illinois device has not yet been used on human patients, only a few more tests are needed before it can be given such a trial.

The ultrasound used has a wave frequency of 1,000,000 cycles a second, 50 times higher than the highest audible pitch. The beam is sent through a salt solution in contact with both sound source and the brain. The latter is exposed through an opening cut through the skull but not through the protective membrane covering the brain.

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STONE EAGLE—This picture shows archaeologists and their assistants at work on one of the stone eagle effigy mounds found in Georgia, but not elsewhere east of the Rocky Mountains.

ARCHAEOLOGY

Georgia Eagle Mound

Quartz arrow point and human bone fragments have been discovered in the unique stone effigy mounds, only found east of the Rocky Mountains.

► AN ARCHAIC quartz arrow point and calcined human bone fragments may hold the key to the age and meaning of the unique eagle effigy mounds, made of stone, found in Putnam County, Georgia. No other stone effigy mounds have been reported in the United States east of the Rocky Mountains.

The single artifact and the human bones have been found by an expedition sponsored by the 4-H Foundation in cooperation with the Georgia Historical Commission and the University of Georgia's department of anthropology.

Archaeologist in charge is Dr. Vincenzo Petrucci. Dr. Arthur A. Kelly, member of the Historical Commission and head of the department of anthropology, is serving as consultant.

Other types of stone mounds are found along the Piedmont belt from Georgia to West Virginia and Pennsylvania. A few have been reported from Ohio. Some of them are large, sometimes as much as 70 feet long and 30 feet wide and up to eight or nine feet high. Most of them are smaller and often the smaller ones are found near a large one.

Up to now no artifacts or other direct evidence that they were constructed by the aborigines has ever been found by an archaeologist, although treasure hunters have reported finding human bones from several of them.

In Putnam County, two eagle effigies

were found. These two are constructed of quartz boulders around a core of quartz outcropping. Both are over a hundred feet long and about 120 feet across the wings and are found in ridges about 13 miles apart.

Hundreds of tons of rock had to be moved before the arrow point and human bones were found. The arrow point was found between the neck and the wing of the eagle beneath some six inches of burned soil, ashes and charcoal.

The human bones were found, scattered over a square yard, between two boulders on the opposite side near the tail in a bed of burned soil and charcoal and stones. The burned bones may well represent a human sacrifice.

Carbon dates are not available as yet, but the absence of pottery in the mound and the surrounding area suggests that the mound may have been constructed in the archaic period.

"Present indications are," Dr. Petrucci said, "that these stone mound effigies were ceremonial objects probably representing the totem of the tribe. The area immediately surrounding the effigies was kept clear of any debris, which would explain why we do not find any potsherds or other artifacts."

"Possibly all of the stone mounds represent a religious complex, the nature of which is still a mystery."

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PSYCHOLOGY

Slot Machine Used To Study Mentally Ill

► AN ESPECIALLY rigged slot machine can be used to study the behavior of mental patients, Drs. Ogden R. Lindsley and B. F. Skinner of the Massachusetts Department of Mental Health and Harvard University told the American Psychological Association meeting in New York.

The two scientists watched how patients worked the slot machine, pulling levers to get candy, cigarettes, or even just colored pictures. The patients were at the machine one hour a day until they had put in about 70 hours.

The machine was set to pay off in two different ways. On one schedule, the patients were paid off by time, getting a reward each minute. On the other schedule, the machine paid off on every twentieth pull of the lever.

The scientists found, after watching the patients, that they could predict how the patients would work the machine.

When they worked for pay by the minute, each patient had his own stable rate of work. Some worked so slowly that they did not even make one pull a minute. Others regularly pulled 140 times a minute.

On the "piece-work" schedule, a break in the rate of work followed each reward from the machine.

The behavior of a mental patient at a slot machine is very similar to that of a laboratory animal—a rat, pigeon or dog, the scientists observed. The break in rate following pay on the "piece-work" schedule is particularly characteristic of the lower animals, they reported.

This shows, they conclude, that the behavior of mental patients is controlled to some extent by the physical environment, it is not based entirely on signals from their dream world.

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ARCHAEOLOGY

African Antiquities Destroyed by Officials

► ARCHAEOLOGICAL MATERIAL of great historical importance in Africa is being destroyed before it can be studied, Sir Mortimer Wheeler, secretary of the British Academy charged at the British Association for the Advancement of Science meeting in Oxford, England.

In Tanganyika, the beautiful palace masque of Kilwa island was robbed of ancient Persian tiles and wrecked by a former government official. At Bagamoyo, carved woodwork, including ornamented doors, were removed and sold in the 1940's without a thought for its historical importance. At Sadani and Moweni, sixteenth century carvings were destroyed and tombs broken up for lime. Great palaces in Zanzibar were destroyed, one of them to make room for a modern school, he said.

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BIOLOGY

Single Diet For All Life

Scientist creates a semisynthetic diet with all nutrients required by any living forms, from man to plants to bacteria. It is called "Universal Diet No. 1."

► A SINGLE diet designed to nourish all forms of life, from man to bacteria, viruses and plants, has been created by Dr. Thomas D. Luckey of the biochemistry department at the University of Missouri School of Medicine.

The diet is semisynthetic. Dr. Luckey calls it "Universal Diet No. 1," and says that it has some limitations and omissions that will be corrected when subsequent universal diets are made.

The diet has now been fed to monkeys, cats, pigs, dogs, rats, mice, rabbits, guinea pigs, an opossum, chicks, goldfish, cockroaches, snails and tomato plants. All these grew at satisfactory rates. The guinea pigs and snails had offspring. Four consecutive generations of mice and cockroaches were fed the diet.

Besides these representatives of different orders of living organisms, such much smaller organisms as yeasts, molds, fungi, algae and bacteria were kept going through ten generations by sterile mixtures of the Universal Diet No. 1 in water.

The diet itself would never be cheered by any chef or epicure, and Dr. Luckey does not say how the monkeys and other animals liked it, although sugar was added to "give it good acceptability." Also, the physical character of the diet was changed to suit the conditions of the experiment or to appeal to the animal being fed.

Large amounts of vitamins were put in in order to satisfy any extraordinarily high requirement that some form of life might have. Special consideration was given to the salt requirements of chicks and guinea pigs, the fiber requirements of rabbits, the high-protein requirement of chicks and the fat requirement of dogs.

The diet was made up of the following ingredients: purified casein (milk protein), corn oil, cornstarch, cellulose, sucrose (sugar), and included potassium, calcium, sodium, an iodide, magnesium, manganese, cobalt, zinc, iron and an aluminum compound. Vitamins A, D, C, E, K and all the B vitamins were included.

The exact forms and quantities of these substances are given in *Science* (Sept. 3).

Dr. Luckey got the idea for the diet from considering the fact that while man and other animals eat quite different kinds of foods, the essential constituents of these foods are largely the same. Discoveries in recent years have further shown that some of the B vitamins essential to man were first discovered as substances needed by bacteria for their growth.

The universal diet, he believes, will be valuable in many kinds of research where keeping diet a constant known factor eliminates variables that could affect the findings of the research.

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TV TOWER — The world's tallest television tower, now nearing completion, is shown here. The triangular 1,572-foot transmitter for station KWTV, Oklahoma City, is 12-foot on a side up to the 1,420-foot level. From there it tapers to the base of the antenna.

ASTRONOMY

Two Sky Objects Spotted in Aquarius

► TWO COMETS, one a new discovery and the other first seen in 1943, have been spotted in the constellation of Aquarius, the water carrier, visible in the southern sky.

Both comets are much too faint to be seen without a large telescope. The new comet, now known temporarily as Comet Van Biesbroeck after its discoverer, Dr. George Van Biesbroeck of Yerkes Observatory, Williams Bay, Wis., is of magnitude 14. The faintest stars visible to the naked eye on a dark, clear night are of magnitude six.

Comet Oterma, of magnitude 19, was first discovered in April, 1943, by Miss L. Oterma. Its orbit lies between those of Mars and Jupiter, so it can be observed throughout its entire path, but it is so faint that sometimes it is not spotted for two or three years.

Comet Oterma was found by Robert G. Harrington and George Abell of Mt. Wilson and Palomar Observatories as part of the National Geographic Society-Palomar Observatory Sky Survey, Harvard College Observatory, clearing house for astronomical information in the Western Hemisphere.

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BIOLOGY

Dog's Social Register

► MONGREL, MUTT or pedigree have no meaning in the world of dogs, and it may very well be that a dog with no background is high up in the canine aristocracy, while his opposite with a string of titles as long as a dachshund, may be just another dog.

Dr. W. T. James, University of Georgia psychologist, told the American Institute of Biological Sciences meeting in Gainesville, Fla., in the canine society there are no social climbers, back-slappers or glad-handers, but many social leaders.

A dog, from the time he is born, is fixed in his social position and no amount of education, good deeds or luck will ever change his status in the dog world. It is virtually an iron-clad caste system.

Among dogs, the whole social order is based on dominance, and every dog bullies the one directly under him. Competition over food is the best method of emphasizing dominance in dogs, according to Dr.

James. When higher and lower social types are placed in a pen together to eat, the dominant dog will approach the food rapidly and let out a warning growl. He then eats all the food.

Dominance is strictly inherited, the psychologist said. The mother dog can no more teach her weak minded pups to be strong leaders than she can teach her dictatorial pups to be humble.

"One aspect of canine society is strangely reminiscent of man's lust for power," he added. "The more power a dog has, the more he wants. Among the upper class there are frequent conflicts to determine which dog is boss, and in the middle class many a minor skirmish for a secondary position. But at the bottom of the ladder there are no conflicts at all."

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Gas temperatures in rocket motors run as high as 6,000 degrees.

MEDICINE

Lung Cancer Hope

► NEWLY-DISCOVERED shadows on old chest X-ray pictures of lung cancer patients give hope that now this killer can be detected at a very early stage when there is a much better chance to remove the cancer by surgery.

The newly-discovered shadows and their significance were reported by Dr. Leo G. Rigler of the University of Minnesota School of Medicine at the meeting of the U.S.-Canada section of the International College of Surgeons in Chicago.

The tell-tale shadows have been seen on X-ray pictures taken five, six and even nine years before the patient had any symptoms whatever of lung cancer. Whenever old films can be found, Dr. Rigler said, signs of disease have almost always been seen in the area of the lung later proved to be cancerous.

These signs of lung cancer that can be seen on X-rays years before symptoms are often of a minor character and easily overlooked.

Dr. Rigler's study not only shows the possibility of detecting lung cancer much earlier, but also shows that the cancer arises on the outer part of the lung more often than was thought. It tends to grow toward the center so that by the time it is removed by the surgeon it seems to have been present near the center of the lung.

The sudden and large increase in lung cancer in recent years in both the United States and other countries is "conduct unbecoming in a so-called chronic disease" and "most uncancerlike," Dr. Halbert L. Dunn, chief of the U.S. National Office of Vital Statistics, Washington, said.

He said that this behavior cries out for explanation. Improved diagnosis and aging of the population do not, in Dr. Dunn's opinion, give this explanation.

In the United States the disease had no sex preference 40 years ago.

Then a gradually more rapid rise developed among men. By 1950, the rate in men was four and one-half times the rate in women.

In 36 years, the rate among women increased eight times, the rate for men 27 and one-half times. In the 10-year period ended with 1950, the rate for women advanced from 3.5 to 4.9 per 100,000 population; for men the rate rose from 10.1 to 22.0.

Dr. Dunn pointed out that in England and Wales, the death rate for lung cancer in men in 1952 was two and one-third times that in the U.S., and for women nearly twice as high. In Copenhagen, the 1950 death rate for men was 36.9; for women 5.3.

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FIRST MECHANICAL HEART—Now presented to the Smithsonian Institution as a permanent science exhibit is the Dodrill-GMR mechanical heart, shown in action at the left, the first device of its kind to be used successfully in human heart surgery. It was developed by Dr. D. M. Dodrill of Harper Hospital, Detroit, and engineers from General Motors Research Laboratories.

BIOCHEMISTRY

Fight Disease, Radiation With Body Chemicals

► GERM DISEASE and damage from X-rays and, perhaps, also from A- and H-bomb radiation may in the future be overcome or prevented by use of chemicals that are natural constituents of the human body.

Experiments pointing toward this are reported by Dr. Hanes Meyer-Doring of Hamburg, Germany, in *Nature* (Sept. 4).

His experiments were made with a chemical he created by combining ascorbic acid, or vitamin C, and cysteine, an amino acid. He calls this compound cysteylascorbic acid.

Mice were protected by this compound against germs of mouse pneumonia and some staphylococcus and streptococcus germs, Dr. Meyer-Doring reports. Toxicity of the compound for mice is negligible.

The possibility that the compound will lessen the toxicity of nitrogen mustard and prevent X-ray damage is now being investigated. If it can do these things, it should aid in leukemia treatment by making possible larger doses of cancer-destroying X-rays and of nitrogen mustard.

If the compound can prevent X-ray damage, it is reasonable to assume it can also prevent damage from other radiation such as that from A- and H-bombs.

The experiment, Dr. Meyer-Doring states, reveals a new principle, namely the use as chemical remedies of natural constituents of the body. For that reason, he is reporting his results so far, although the chemical constitution of the cysteine-ascorbic acid compound has not yet been certainly established.

Science News Letter, September 18, 1954

HEMATOLOGY

Blood Tells Story Of Polio Outbreaks

► BLOOD TELLS the story of polio, Dr. J. H. S. Gear, director of research at the South African Institute for Medical Research, Johannesburg, said at the Third International Poliomyelitis Conference in Rome.

"An individual's past experience of infections is clearly imprinted on his blood and by appropriate tests it can be revealed," he said. "By surveys of the antibodies in sera from representative samples of a community, it is possible to determine the nature of the infections which have affected the population, when they last occurred, and in what sections of the population they were most prevalent."

"It has also been possible by serum surveys to compare the incidence and distribution in the various regions of the world."

Dr. Gear reviewed reports of studies made in various parts of the world, each of which involved blood tests for the presence of antibodies against the three major strains of polio virus.

Science News Letter, September 18, 1954

PSYCHOLOGY

Your Nose Is a Chemical Analyzer

► **YOUR NOSE** is a chemical analyzer. If you sniff a mixture of odorous substances, after a little study you can name the substances that make up the mixture.

This result of an experiment conducted by Drs. Lloyd H. Beck, James J. Stovin and John J. Doyle of Yale University was reported to the American Psychological Association meeting in New York.

The experiment was tried on 112 persons, some of whom were children.

The odor of the mixture, it was found, can be analyzed by the nose when the odors are familiar or unfamiliar, when the material smelled was a liquid or a gas, and when either one or both nostrils are used.

In this respect, the nose performs like the ear which can hear the separate sounds making up a chord.

It is unlike the eye. When you look at a mixture of yellow and blue, you see green, not a combination of yellow and blue.

Monosodium glutamate, sold to the public as a seasoning to sharpen the flavoring of foods, has no effect on increasing the keenness of your taste, the psychologists learned from another report by Drs. Francis J. Pilgrim, Howard G. Schutz and David R. Peryam of the Quartermaster Food and Container Institute, Chicago.

This substance does not intensify food flavors, the scientists conclude from experiments. It is simply another seasoning that may contribute a flavor of its own to a complex food flavor.

Science News Letter, September 18, 1954

MEDICINE

Simple Bone Drill Speeds Tests on Polio Vaccine

► **DESIGN** OF a bone drilling and injecting device created especially to speed testing of the Salk polio vaccine for its mass trials on school children last spring is announced by its inventor, Dr. William H. Berkeley of the U.S. National Microbiological Institute, Bethesda, Md.

The Institute's laboratory of biologics control was one of the three laboratories responsible for safety testing all the vaccine used in the mass trials. The tests were made by injecting the vaccine into the brains of monkeys.

A large amount of vaccine had to be tested and the testing had to be done swiftly so that the children in the mass trials could be vaccinated before the start of this summer's polio season.

Previous methods for making injections into the brain involved either cutting a disk out of the skull or cutting the skin and drilling holes through the skull to admit the injecting needle. Both methods are, as Dr. Berkeley points out, tedious and time consuming.

With his method, injections could be made in 18 monkeys in an hour. With

two operators working, the time for drilling two holes and making the injections averaged about one minute per monkey.

The instrument has now been used on about 500 monkeys. It consists essentially of a stainless steel cup with a hole through the bottom and two needle-sharp stainless steel pins, one on each side of the hole. A drill bit for penetrating the skull bone fits through the hole.

When used on the monkeys, the hair on the head was clipped as short as possible and the skin then sterilized with iodine followed by alcohol wash. The instrument is placed firmly against the head of the animal so that the pins stick through the skin and rest on the skull bone. This keeps both the instrument and skin from slipping.

The bit of the electric drill is then inserted through the hole in the instrument and a hole is drilled through the skull bone. The drill bit is removed and the vaccine injected into the brain through this same hole.

In reporting design of the instrument in *Science* (Sept. 3), Dr. Berkeley points out that the instrument may be adapted by slight changes in size to fit any hand or electric drill.

Science News Letter, September 18, 1954

PUBLIC HEALTH

Pillow or Painter's Mask For Defense Against BW

► **FOR DEFENSE** in case of germ warfare, you might tie over your mouth and nose a child's size pillow stuffed with cotton batting. Or you might put on a painter's spray mask.

The pillow, if properly constructed, and the painter's mask, if fitted tight to the face, would filter out 94% or more of germ-laden mist, scientists at the Army's biological warfare center at Camp Detrick, Md., have found.

Either the pillow or the painter's mask are about ten times as efficient at this particular job as the mask usually worn by surgeons and nurses in hospital operating rooms. This, however, does not mean the hospital masks are faulty. They were not designed to keep out germs dispersed in aerosols such as might be used in BW, or germ warfare. The germs the hospital masks are designed to stop are the much larger particles or droplets of a sneeze or cough.

The masks, including the pillow-like one, and their ratings at stopping germs in aerosols are part of an exhibit the Safety Division of Camp Detrick put on for the International Congress of Clinical Pathologists' meeting in Washington.

The mask that looks like a child's pillow is the Public Health Service's anti-plague mask.

The safety division's job at Camp Detrick is to develop safe methods for scientists and technicians to work with deadly disease germs. Many of the methods which have won safety awards for Detrick have been adopted by laboratories elsewhere.

Science News Letter, September 18, 1954

IN SCIENCE

PUBLIC HEALTH

North Europe Nations Joined in Polio Fight

► **FIVE NORTHERN** European nations have international agreements for joint action in the war on polio, Dr. Svend M. Clemmensen of the Kommunehospitalet, Copenhagen, Denmark, reported at the Third International Poliomyelitis Conference in Rome.

The pool includes the national polio foundations of Denmark, Finland, Iceland, Norway and Sweden.

During serious epidemics, these countries pool their efforts and share respirators, doctors, nurses, physiotherapists and other assistants.

"As soon as the number of respirator cases in an epidemic exceeds 100, sometimes even before, the co-operative system will be brought into action," Dr. Clemmensen reported. "Our nations' foundations will immediately guarantee the necessary money, and later on each country will pay for the assistance which it has received."

Most of the polio cases in the north European countries are treated in state or municipal hospitals.

Science News Letter, September 18, 1954

PSYCHOLOGY

Test for the Boss Uses Problems in In-Basket

► **NOW** A test for the boss!

For many years psychologists have been bringing out tests to measure aptitude for various jobs in office and shop from the file clerk to a television repair man. Now a test for "administrative proficiency" has been reported to the American Psychological Association meeting in New York.

The test takes the form of an "in-basket," which any administrator knows can be a real problem. In the basket are letters, memoranda, etc., all calling for immediate action. In some cases, it is impossible to see what the problem involves from the study of a single letter or memorandum; it is necessary to bring together several separated papers in order to size it up.

The person tested is instructed to take definite action on each problem within the two hours allowed, even though they may lack extensive experience in the imaginary situation and, can not get more information or exchange ideas with others.

Results show that it is possible to construct a test of administrative proficiency that can be administered to a group and scored objectively, Drs. Norman Frederiksen and D. R. Saunders of Educational Testing Service, Princeton, N. J., said.

Science News Letter, September 18, 1954

CE FIELDS

PSYCHOLOGY

Mild Electric Current Picks Brain-Injured Baby

► DOCTORS IN the future may be able to diagnose brain injury in a newborn baby by applying a mild electric current to one leg.

The behavior of a normal baby is very different from that of a brain-injured child when the current is applied, Dr. Frances K. Graham of the Washington University School of Medicine, St. Louis, told the American Psychological Association meeting in New York.

The normal baby is increasingly sensitive to the electric current during the first five days of his life.

None of the normal babies, but 71% of the brain-damaged infants were comparatively very unresponsive to the current, and their failure to respond persisted for a number of days.

Apparently, the brain-damaged baby can feel the current but does not react to it.

Often the brain-damaged baby would cry when the mild current was applied, but would not jerk his leg away until the current had been stepped up to much higher intensity.

The electric current test shows great promise as a means for knowing which babies have suffered brain damage, Dr. Graham told the psychologists. It is reliable, sensitive and can be given in about ten minutes without any danger.

Science News Letter, September 18, 1954

PSYCHOLOGY

Good Fighters Superior in Mind, Body, Social Talent

► THE SOLDIERS who make the best fighters when they get into actual combat are superior mentally, physically and socially to men who fail to fight well.

What makes a man a good fighter in combat was discovered by three psychologists who went to Korea in the summer of 1953 for an on-the-spot study of front line infantrymen.

The psychologists are Drs. Robert Egbert, Tor Neeland and Victor Cline of Human Research Unit #2 Office, Chief of Army Field Forces, Fort Ord, California. They reported their results to the American Psychological Association meeting in New York.

To pick a group of good fighters and poor fighters for their comparison, the psychologists interviewed 647 men from rifle companies. The men described instances they knew that were examples of either superior action in combat or poor performance.

Over 1,100 men were described in the interviews. Of these, 345 were selected for whom at least two men agreed in classifying them as good or poor fighters.

A psychological testing center was set up near Ch'un'ch'on to study these 345 men. They were given a battery of physiological measures, mental tests and personality tests.

The good fighters, it was found, are more intelligent than poor fighters. They have better mental health.

The good fighter is taller, heavier, healthier and more muscular than is the poor fighter.

The good fighter is a doer. He likes to take part in football, swimming, hunting and fishing. He wants to tinker with a car or operate a bulldozer. The only things the poor fighters took part in more was going to the movies and art work.

The good fighter gets along well with other men. He is picked by other men to go around with or as a leader. He has more leadership qualities and he is more masculine.

Science News Letter, September 18, 1954

MEDICINE

Home Treatment OK For Most Polio Patients

► AT LEAST 80% of the polio patients could be treated at home, even in the acute stage of the disease, if conditions are good, Dr. W. Ritchie Russell of Oxford, England, told doctors attending the Third International Poliomyelitis Conference in Rome.

These cases do not need special treatment. The other 20%, however, made up of the severely crippled and those who have bulbar polio with breathing difficulty, must have the services of a team of experts to meet emergencies that may arise.

Dr. Russell stressed the importance of physical rest during the acute illness. At this stage the polio virus is already in the motor nerve cells and no serum protein, such as gamma globulin, no antibiotic and no physical treatment can do any good.

"Physical rest," he declared, "is our most powerful method of influencing for good the virus-cell relationship during the acute illness, and indeed is as yet our only method of treatment which shows any promise of being effective at this stage of the disease."

To "encourage" this physical rest, sedatives may be used. In some cases of bulbar polio, sedatives may be dangerous to the breathing center. Some of these patients are so restless, however, that the sedatives are urgently needed. To meet this difficult situation, tracheotomy, or cutting an opening through the neck into the windpipe, and appropriate artificial respiration may be needed so that the necessary sedatives can be given with relative safety.

Dr. Russell advised against fastening paralyzed legs or arms to prevent deformity, and said that hot packs are of more sentimental than scientific value.

Science News Letter, September 18, 1954

ASTRONOMY

Baseball Diamond In the Heavens

► THE GREAT Square of Pegasus has been seen as a giant baseball diamond in the sky, instead of the winged horse pictured by the ancients, by an alert young visitor to the Hayden Planetarium in New York.

Now is a good time to meet the Great Square, visible over the eastern horizon in the middle evening hours, for it is one of the landmarks of the sky and will be prominent through next January.

This autumn star grouping is not a constellation in itself, but consists of four bright stars, two of which belong to Andromeda, the other two being part of Pegasus. These four stars make a giant baseball diamond in the sky. (See SNL, Aug. 21, p. 123.)

Players in the heavenly ball game have names not too different from those on big league teams: On first base is Alpheratz, second base is Algenib and third base, Markab. At the bat is Scheat. Tau and Upsilon, two stars inside the Great Square near home plate, represent the short stop going up to talk over signals with the pitcher.

Back of home plate is Eta, the catcher, and Mu and Lambda, the manager giving "lip" to an umpire.

The young New Yorker identified the players as the Yankees with manager Leo Durocher giving "lip" to the umpire.

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ENGINEERING

Three Radio Telescopes Track Sun Automatically

See Front Cover

► THREE RADIO telescopes for tracking the sun automatically are a feature of Gun Barrel Hill, Colo., field station of the Central Radio Propagation Laboratory of the National Bureau of Standards, Boulder, Colo.

President Eisenhower dedicated the new laboratories, also the home of the NBS-AEC Cryogenic Engineering Laboratory, on Tuesday, Sept. 14.

The radio telescopes, designed to receive radio waves sent out by the sun, are painted red, white and blue. They are shown on the cover of this week's SCIENCE NEWS LETTER.

The red antenna, in the foreground, receives signals at 460 megacycles; the white antenna, in the center, 167 megacycles and the blue antenna, in the background, 80 megacycles, although it is not being used currently.

Gun Barrel Hill, on which the three radio telescopes are located, is so named because concentric rings around the hill make it look like a gun barrel.

Science News Letter, September 18, 1954

BIOLOGY

Youth for Living Cells

Tissue culture keeps cells young for years. Time, space and money seem only limits to their longevity. Quick freezing also preserves organs and tissues for later use.

► A TOMATO root has been steadily growing for 21 years, its cells still young and vigorous; a bit of a chick's embryonic heart grew for many years before "euthanasia" was performed on it.

Does this mean that modern science can find man's long-sought goal of eternal youth and immortality?

Tissue culture seems definitely to have made a kind of immortality theoretically practical. Animal and plant cells have been kept alive for years in special cultures. Only time, space and money impose limits on the life-span of the cultures.

A culture of heart cells from a chick embryo was started in 1912 by the late Nobel prize-winner, Dr. Alexis Carrel. The tissue was not discarded until many years later when its scientific usefulness had ended.

Last spring a culture of tomato root cells, eternally young in a sense, celebrated its 21st birthday. The youth and continuance of this culture comes from the scientific care and imagination of Dr. Philip R. White, not from a drink at the magical Fountain of Youth. Dr. White is at the Roscoe B. Jackson Memorial Laboratory, Bar Harbor, Me.

He started a tiny bit of tomato root, cut off from a germinating seed, growing in a solution containing plant nutrients, and the root has been growing at the rate of about one-third of an inch a day since March, 1933.

Periodically Destroyed

Paradoxically, partial destruction of the culture periodically is one of the secrets of this kind of cellular immortality. The rate of growth of these cells is so great that only by destroying much of the culture each week can a scientist keep the culture in bounds. Without this destruction, the tomato root would have grown to astronomically huge lengths by this time, assuming there was some way to keep it growing.

People are sometimes surprised when something about a plant turns out to be more complicated than an animal. Dr. Carrel used a combination of chicken blood plasma and chick embryo fluid as the nutrient for his heart tissue culture.

Plant cells, however, are not bathed in a free nutrient fluid when they grow naturally. Each cell receives its food by diffusion through neighboring cells. For this reason, plant cell culture had to wait for the development of man-made nutrient solutions that would sustain cell life.

Dr. White was the first scientist success-

fully to design such a solution. Its complexity can be somewhat indicated by the number of ingredients: oxygen, hydrogen, carbon, calcium, potassium, magnesium, nitrogen, sulfur, phosphorus, iron, manganese, zinc, boron, iodine, carbohydrates, vitamins, hormones, amino acids and organic complexes.

Mixed in proper proportions, these substances formed a successful nutrient. Eternal youth is much more complicated than seekers for the Fountain of Youth imagined.

Another problem to be overcome in tissue culture investigations is that of infection. Bacteria, viruses, fungi and other infectious agents would quickly kill off any cultures they reached. All the nutrients are sterilized and every precaution is taken to keep the cultures in a sterile condition.

In 1946, Dr. White was able to make a nutrient solution for chick embryo heart cells. Heart tissue has been kept alive and pulsing for 12 weeks in this medium.

Synthetic Nutrient

This synthetic nutrient fluid for animal cells eliminated one of the great difficulties that had faced experimenters with the Carrel-type culture.

The chemical structure of body fluids is not completely known. This meant it was impossible to be exact in analyzing the effects of substances on cell growth. The synthetic nutrient solution for animal cells was made up of dextrose, mineral salts, 11 vitamins and 12 amino acids. By varying the composition of this solution the effect of nutrients on cell growth and division can be studied directly.

Such tissue culture work has been used in cancer studies in an attempt to differentiate between the biochemical requirements and structure of cancerous and normal cells. Dr. White is now growing mouse tumors in this medium.

Hopes in Quick-Freezing

This kind of immortality and eternal youth probably will not satisfy man's dream, but it does point up the fact that individually and in tissues the cell seems to be capable of living a very long time—provided enough scientists are around to protect it from the world.

Quick-freezing techniques offer more hope to those who want a Fountain of Youth to help the middle-aged business man who has discovered his arteries are older than his ideas.

Two London University scientists discovered that skin from a rabbit's ear could



"ETERNAL" TOMATO ROOT — Dr. Philip R. White, Jackson Memorial Laboratory, Bar Harbor, Me., examines a flask holding part of his tomato root culture that has been steadily growing since 1933. The root is about the size of store twine.

be transplanted after four months in a freezer. The rabbit skin was first impregnated with glycerine and frozen at 70 degrees below zero, Centigrade.

This led to the suggestion of a skin or artery bank in which a person could deposit some of his own youthful body tissues for later withdrawal. The frozen tissues would then replace arteries worn out by years of tension, or skin wrinkled by the advance of age.

In similar experiments, Drs. A. S. Parkes and A. U. Smith of the British National Institute for Medical Research succeeded in grafting male sex glands in rats when the glands had been stored in a frozen state for as long as 22 weeks.

They hinted in their report that the special freezing method might make possible transplants of human gland tissue. The glands were frozen in a material containing glycerol.

The same method was used successfully for grafts of rat ovarian tissue.

The most serious problem facing any surgical attempt to transplant organs from one individual to another is the reaction of the body to a foreign protein substance. Grafts to be successful must be from the subject's own body or an identical twin.

At the University of Kansas Medical Center, surgeons have succeeded in transplanting quick-frozen lungs from one dog to another. Using dogs which were litter

mates, the dogs survived the operation for 30 days.

Drs. Creighton A. Hardin and C. Frederick Kittle found that cortisone helped the dogs with grafted lungs survive a little longer, but benadryl and X-ray treatments did not help in fighting the body's reaction to a foreign substance.

One experiment was made by removing the spleen, the organ which manufactures the antibodies to foreign substances in the body. This, however, did not affect survival rates in the dogs.

Although the dogs survived the operation for only short periods, the transplanted lungs did function as breathing organs. Proof of this came from two animals that survived two and one days, respectively, when they had only the transplanted lung to breathe with.

MEDICINE

Forsee Better TB Cures

► A BETTER understanding of how the body is damaged in tuberculosis and some future hope of new weapons against the disease is coming out of research at the University of California.

Dr. James B. Cason, professor of chemistry, has isolated from the tuberculosis germ a rare acid that causes TB lesions in animals.

He has also worked out some of the architecture of the acid molecule, and has built a synthetic model containing all of the molecule's known structural features.

The synthetic molecule and similar molecules are being tested in animals by Dr. Sanford Elberg, professor of bacteriology. The tests are not complete, but they already show that small differences in geometrical molecular shape can cause very large variations in reactions of the animals.

An implication of the work is this: if the chemical proves beyond question to be responsible for the TB lesion, tuberculosis may at some time in the future be fought on new grounds.

The scientists cautioned, however, that a great deal of work remains to be done, and that no treatment could be based on their research to date.

Freezing has also made a kind of immortality possible for bulls. The situation is reminiscent of that described in the popular song of several years ago, "I'm My Own Grandpa."

By freezing the male sex element of the bull, it is possible for a bull to father calves long after he died. This might give rise to a "family" in which every offspring for several generations had the same father.

Frozen semen banks have not yet taken their place with blood and bone banks, but live calves have been born from cows artificially bred with frozen semen. The technique used is the glycerol method developed by the British scientists. The Wisconsin Scientific Breeding Institute has bred several thousand cows with the frozen semen.

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The work is an outgrowth of research begun about 20 years ago by Dr. R. J. Anderson at Yale University and Dr. Florence Sabin of the Rockefeller Institute. Dr. Anderson isolated a mixture of branched chain fatty acids from tubercle bacilli, and Dr. Sabin found they caused TB lesions in animals.

Not until Dr. Cason isolated a pure component from the mixture, was it possible to tell precisely which acid was responsible for the damage. The acid appears to be the agent, or one of the agents, by which the bacillus harms the body.

Dr. Cason and his co-workers have separated the fatty acid from five different virulent strains of tuberculosis. It was not found in two non-virulent strains. Other strains must be investigated to determine if the acid makes the difference between virulence and non-virulence.

The research is very tedious because only minute quantities of the acid are present in the bacilli. Two pounds of bacilli will yield only about one-hundredth of an ounce of the toxic acid. Only about one-twentieth of an ounce have been isolated so far.

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PATHOLOGY

Liver Cancer, Cirrhosis Increase Since Repeal

► BOTH LIVER cancer and cirrhosis of the liver have been increasing since the repeal of prohibition, it appears from figures reported by Dr. Hugh A. Edmondson of Los Angeles to the International Congress of Clinical Pathology meeting in Washington.

The increase in cirrhosis has been five-fold, that of cancer of the liver ten-fold since repeal of prohibition, Dr. Edmondson said. His figures were from autopsy reports at the Los Angeles County Hospital.

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Timely Science Books

The Atom at Work

by JACOB SACKS, Brookhaven National Laboratory. The complete dramatic story—written for the layman—of the history and present-day applications of radioactive isotopes to medicine, industry, agriculture, chemistry, biology, etc. Describes developments from the Curies' discovery of radioactivity to the atom-smashing victories of the scientists who produced radioactivity. Book tells how isotopes are employed today to help create a healthier, happier world. 327 pp., 55 illus. \$4.50

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ANIMAL COURTSHIP—Maurice Burton—*Praeger*, 267 p., illus., \$4.00. The author points out that in animal courtship, as in human courtship, symbolism and ceremony play a very large part.

BUFO: The Story of a Toad—Robert M. McClung—*Morrow*, 48 p., illus., \$2.00. Written by the curator of mammals and birds at the Bronx Zoo, this book tells the very young about the first three years in the life of a toad.

CHEMICAL PATHWAYS OF METABOLISM, Volume II—David M. Greenberg, Ed.—*Academic*, 383 p., illus., \$9.50. Six experts contribute to this study of metabolism.

DIRECTORY FOR EXCEPTIONAL CHILDREN: Schools, Services and Other Facilities—E. Nelson Hayes, Ed., with preface by M. E. Frampton and E. D. Gall—*Porter Sargent*, 96 p., cloth \$2.20, paper \$1.10. Facilities and services, both public and private, to meet the needs of the estimated 12% of all school-age children who require special attention.

ENTIRE FUNCTIONS—Ralph Philip Boas Jr.—*Academic*, 276 p., \$6.00. Not intended to be a comprehensive treatise on entire functions, but rather to give an account of the extensive modern theory of functions of exponential type.

F.B.I.: The "G-Men's" Weapons and Tactics for Combatting Crime—C. B. Colby—*Coward-McCann*, 48 p., illus., \$1.00. This picture book, illustrated with official FBI photographs, tells the story of scientific crime detection and the rounding up and capture of criminals and spies.

FROGMEN: Training, Equipment and Operations of Our Navy's Undersea Fighters—C. B. Colby—*Coward-McCann*, 48 p., illus., \$1.00. A picture book of official U. S. Navy photographs which show the story of the underwater demolition team.

GENERAL ELECTRICITY—E. W. Jones—*McKnight & McKnight*, 2nd ed., 120 p., illus., paper, \$1.25. Intended to give young people a practical working knowledge of common, everyday electricity, by explaining the basic principles of electricity and magnetism, as well as the operation and care of common household devices.

MATHEMATICAL PUZZLES AND PASTIMES—Aaron Bakst—*Van Nostrand*, 206 p., illus., \$3.75. The aim of this book, according to the author, is to dispel the idea that mathematics cannot be relaxing. Mathematical recreation may be thought of as permitting mathematics to "let down its hair," yet retaining proper regard for mathematical principles.

THE MYOLOGY OF THE PECTORAL APPENDAGE OF THREE GENERA OF AMERICAN CUCKOOS—Andrew J. Berger—*University of Michigan Press, Miscellaneous Publications, Museum of Zoology*, No. 85, 35 p., illus., paper, 50 cents. The wings of the three genera reported in this paper were selected for study largely because of the marked differences in their locomotor habits.

NUMBERS: Fun and Facts—J. Newton Friend—*Scribner's*, 208 p., illus., \$2.75. Telling the story of numbers, their origin and peculiarities, and of the traditions, legends and superstitions that have, over the ages, been associated with them.

PAWS, HOOES, AND FLIPPERS—Olive L. Earle

—*Morrow*, 192 p., illus., \$3.50. "An animal's feet," the author explains, "are often an important clue to his order and they tell a great deal about the way he lives." This book for young people describes mammals of both land and sea.

POLICE: The Work, Equipment and Training of Our Finest—C. B. Colby—*Coward-McCann*, 48 p., illus., \$1.00. The official photographs in this book illustrate the operations of a modern police force.

PROCEEDINGS OF THE INDIANA ACADEMY OF SCIENCE: Vol. 63, 1953—Benjamin Moulton, Ed.—*Indiana State Library*, 292 p., illus., paper, \$3.00.

QUALITATIVE ANALYSIS: Using Semimicro Methods—Esmarch S. Gilreath—*McGraw-Hill*, 287 p., illus., \$4.25. A text for a one-semester course written to answer the demand for a broader theoretical approach with less emphasis upon laboratory exercises.

REPORT OF THE COMMITTEE ON THE MEASUREMENT OF GEOLOGIC TIME 1952-1953—John Putnam Marble, Chairman—*National Academy of Sciences—National Research Council*, Publication No. 319, 187 p., paper, \$1.50. The latest in the series of annual reports of the committee.

SELECTED PAPERS ON NOISE AND STOCHASTIC PROCESSES—Nelson Wax, Ed.—*Dover*, 337 p., cloth \$3.50, paper \$2.00. Selected to meet the needs of physicists, mathematicians and engineers.

SKYROCKETING INTO THE UNKNOWN—Charles Coombs—*Morrow*, 256 p., illus., \$4.00. Excellent photographs, together with brief text, tell young people and their elders the story of rocket and jet plane developments in the U. S. and their bearing on the possibility of space travel in our lifetime.

SMOKE EATERS: Trucks, Training and Tools of the Nation's Firemen—C. B. Colby—*Coward-McCann*, 48 p., illus., \$1.00. A picture book on modern fire-fighting methods.

SUCCESSFUL COMMERCIAL CHEMICAL DEVELOPMENT—H. M. Corley, Ed.—*Wiley*, 374 p., illus., \$7.75. This book was authorized and sponsored by the Commercial Chemical Development Association to document the important principles in selecting promising new chemicals and developing them to the stage of economic importance.

SYSTEMATICS AND ZOOLOGICAL PHILIPPINE AMPHIBIA—Robert F. Inger—*Chicago Natural History Museum, Fieldiana: Zoology*, Vol. 33, No. 4, 349 p., illus., paper, \$6.00. Written by the curator of amphibians and reptiles of the Museum.

THE VITAMINS: Chemistry, Physiology, Pathology, Vol. II—W. H. Sebrell Jr. and Robert S. Harris, Eds.—*Academic*, 766 p., illus., \$16.50. Second in a three-volume reference work, covering the vitamins from choline to pantothenic acid.

Science News Letter, September 18, 1954

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The **Annual National Science Talent Search** (started in 1942) is held each year for seniors in high school who want to compete for \$11,000 in Westinghouse Science Scholarships for their college education. Annually 300 are honored. Of these, 40 boys and girls, chosen as winners, also receive a five-day all-expenses-paid trip to Washington, D. C., to attend the Science Talent Institute; the 14th will be held in 1955. Experience in science clubs and participation in science fairs is great practice for those who are planning to compete in the STS when they are old enough.

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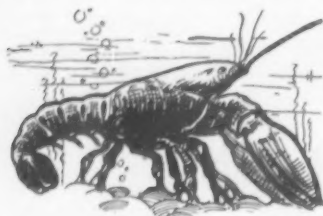
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MARINE BIOLOGY

NATURE RAMBLINGS



Lobster

► AN EARLIER generation once took great delight in a story about a Midwestern farmer who refused a lobster on the grounds that he "didn't eat bugs."

Modern refrigerated railroad cars and anywhere-any time air cargo service have made it possible for the innermost of inlanders to have lobster regularly now. Most of us "eat bugs" even if our grandparents could or would not have them in the house.

The farmer of the anecdote was not so far wrong at that.

The lobster and his relatives the crab, shrimp and inland "craw-dads" really are cousins of the insects. They form the marine division of the animal Phylum of Arthropoda, which means "jointed-leg animals," just as the insects form the infantry and airborne divisions.

The lobster and his relatives are known collectively as the Crustacea because of the

hard shell, or crust, in which they are encased.

Lobsters and insects are alike in having jointed bodies and legs, in having their skeletons on the outside rather than the inside of their bodies, in having compound eyes made up of a mosaic of little eyes, and in many other respects.

The lobster differs from the insect in the obvious matter of having no wings; he would have little use for them in the watery depths he inhabits. Neither does the lobster have a division between head and chest, such as an insect has; his chest begins right under his chin, without formality of a neck.

As if to make up for his lack of wings, the lobster has two pairs of antennae or feelers. The insect has but one pair. And finally, while the insect has only six legs, the lobster glories in ten. He has two of the most powerful sharp-ridged claws in the marine kingdom and no hesitation in using them if a careless fisherman picks him up by the wrong handle. By reason of his legs and claws, the lobster and his nearer relatives are known to zoologists as "decapod crustaceans."

Recently scientists have begun to suspect that the lobster has a hidden talent which puts him in the company of such skilled navigators as the homing pigeon and the honey bee.

Experiments with lobsters off Bermuda showed they can return unerringly to their favorite feeding grounds even when taken far out into deep water or to the other side of large land masses.

The how and why of the remarkable homing instinct remains an unanswered and puzzling biological mystery.

Science News Letter, September 18, 1954

Questions

BIOLOGY—How is a dog's social position determined? p. 182.

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HEMATOLOGY—How does blood tell the story of polio outbreaks? p. 183.

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NUTRITION—What is "Mellorine"? p. 178.

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Photographs: Cover, National Bureau of Standards; p. 178, General Electric Company; p. 179, T. E. Powell Jr.; p. 181, Vincenzo Petrucci; p. 182, American Chain & Cable Co., Inc.; p. 183, General Motors; p. 184, Jackson Memorial Laboratory; p. 192, True Temper Corporation.

MEDICINE

Long-Lasting One-Shot Polio Vaccine Closer

► HARMLESS AND immunity-producing strains of each of the three types of polio virus have been discovered and their ability to produce immunity in human volunteers demonstrated, Dr. Albert B. Sabin of the University of Cincinnati announced at the Third International Poliomyelitis Conference meeting in Rome.

These live virus strains may become the polio vaccine of the future. They would, it is hoped, make it possible to give long-lasting resistance to the disease from a single injection.

The polio vaccine now on trial in the United States is made from killed viruses and must be given in two or three injected doses. How long its protection lasts is still unknown.

The polio virus strains Dr. Sabin has now announced have been injected into the gray matter of the spinal cord of chimpanzees. Neither paralysis nor nerve damage developed. Their ability to produce immunity to polio was shown in chimpanzees and monkeys as well as human volunteers. They were effective when given by mouth and by injection.

Science News Letter, September 18, 1954

ASTRONOMY

Nova Spotted In Southern Sky

► A NOVA, a star that suddenly explodes in a brilliant blaze of light, has been discovered in the constellation of Sagittarius, the archer, low in the southern sky.

News of its discovery on Aug. 30 by astrophysicist Paul Wild of the California Institute of Technology, Pasadena, has been sent to astronomers around the country by Harvard College Observatory.

The nova's magnitude was 10.5 when it was first spotted, but it was then already fading rapidly from its highest brilliancy. In the past six months, Mr. Wild has also discovered two supernova, according to Mt. Wilson and Palomar Observatories. (See SNL, June 12, p. 375.)

Science News Letter, September 18, 1954

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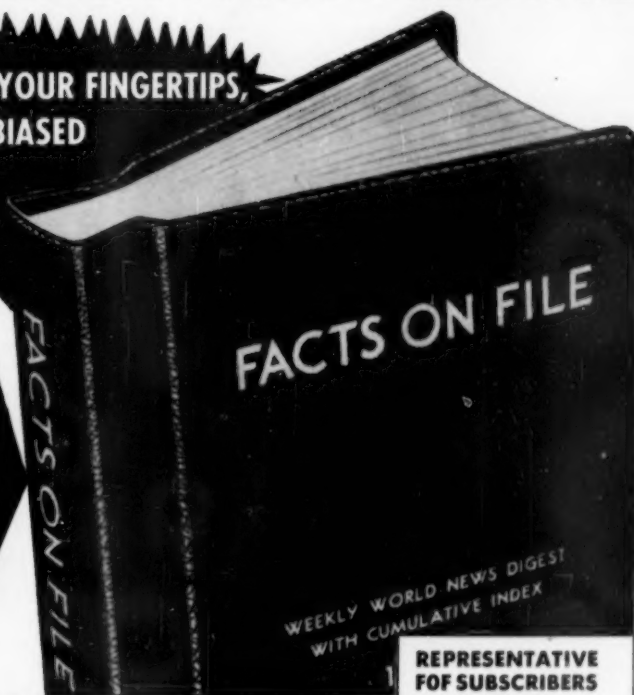
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✿ **RUG WEAVER**, powered by electricity, speeds up a popular but time-consuming hobby. The gun-like weaver, costing about \$90, is simply guided over any pattern the user may draw on the rug backing. The unit makes up to 200 loops per minute in various loop lengths from 3/16 to two inches.

Science News Letter, September 18, 1954

✿ **REFRIGERATOR DISPENSER**, at a squeeze of its rubber-bulb top, delivers a glassful of the liquid it stores. Basically an air-pressure pump, the one-gallon unit stays in the refrigerator until emptied, and therefore is not likely to be broken or its contents spilled.

Science News Letter, September 18, 1954

✿ **HOLLOW GLASS block** has a pale green fibrous glass screen sealed into the center which reduces heat transmission and excessive brightness and glare. Light directing patterns are built into the block's inner surfaces and partial vacuums on both sides of the green filter keep out much of the sun's heat.

Science News Letter, September 18, 1954

✿ **"INDESTRUCTIBLE" HAMMER** can be run over by an automobile without harming the tool, even when propped



against a two-by-four, as shown in the photograph. The hammer's unique tubular steel shaft, similar in construction to a golf-club shaft, is covered with a thick rubber-fiber grip which absorbs shock.

Science News Letter, September 18, 1954

✿ **MATTRESS AND foundation** are combined into one unit, six and one-half inches deep, which can be made firmer or softer by inflating or deflating lateral air cylinders sandwiched between foam rubber cushioning. In double bed units, there is an independent control unit for each half of the bed so that each sleeper may inflate his part of the mattress as he desires.

Science News Letter, September 18, 1954

✿ **POCKET LEVEL** is as easy to carry as a fountain pen because it weighs less than an ounce, is about the same size and has the same pocket clip as a pen. Useful for leveling clocks and appliances, and for do-it-yourself chores of all sorts, the tool is accurate and inexpensive.

Science News Letter, September 18, 1954

✿ **VENETIAN BLIND brush** fits onto standard vacuum-cleaner hose so that dust removed from the blinds is pulled inside the cleaner. The self-cleaning revolving brushes fit curved slats, and there is a model available for flat slats.

Science News Letter, September 18, 1954

✿ **NEW TV set** is tuned from knobs above its picture tube to eliminate stooping or squatting while making picture adjustments. Its hinged lid permits a serviceman to get into the workings quickly for repairs. Whole circuit units plug into the chassis to speed repairs and improvements. The set features two high-fidelity loudspeakers, and a TV antenna that doubles as the radio aerial in the combination models.

Science News Letter, September 18, 1954

Scientific Instruments You Can Make

How teen-age scientists have designed and built various scientific instruments. References guide the reader to research in the fields opened by use of these instruments.

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Do You Know?

Women drivers are involved in only 12% of the total auto accidents in the U. S.

U. S. national forests yielded a \$67,000,000 income during the year ending June 30, 1954.

Ground-nesting termites sometimes get into basement and porch floors and may attack rugs and carpets.

Stannard Rock is the most remote lighthouse operated by the federal government; located southeast of Keweenaw Point in Lake Superior, it is 24 miles from the nearest shore.

Veterinarians report success with a new liquid bandage which, when sprayed over a wound, quickly dries to a tough, adhesive, transparent film that stays in place for a long time.